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Château-Musa: a new vintage

Indigenous knowledge

Plantain commodity chain

Bananas in the city

Untangling the root system

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Vol. 12 No.1

Cover photo:
At the plantain packing station, Costa Rica
(M. Bedford, Baobab production)

Contents

Table 5. Microbiological characteristics of final product.

Type of test	Technical rule	(CFU/ml)
Aerobic mesophylic germs on deep plates	MB-Met-01	$11*10^1$
Total coliforms	MB-Met-02	<3*
Faecal coliforms	MB-Met-03	<3*
Mould and yeasts	MB-Met-05	<10
Lactobacillus	MB-Met-12	<10
Sulphite reducing spores	MB-Met-10	<10

CFU/ml: Colony forming units per ml.

* Most probable number of microorganisms.

Microbiological analysis demonstrates that the selected time and temperature of pasteurisation were the most suitable for the control of pathogenic and non-pathogenic microorganisms that can affect product quality and stability.

The by-product remaining after the fermentation process has little potential for other uses.

The organoleptic characteristics the final product classified it as a sparkling wine, with no artificial addition of gas, a quality typical of wines produced by natural fermentation.

The yield of product of the process is 80%.

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The authors *are respectively agronomist and senior professor at the* Departamento de Fitotecnia, Universidad de Caldas, Colombia.
E-mail: cafolios@cumanday.ucaldas.edu.co

Indigenous knowledge

Varietal selection by growers in central Cameroon

C. Mengue Efanden, L. Temple and K. Tomekpe

The diet of the inhabitants of the forested regions of Cameroon is based on starch, part of which comes from plantains (Dury *et al.* 2002). An increase in production using new techniques is necessary in order to meet the challenge of providing food security for the country (Temple 2000). Varietal improvement contributes to these changes, but although the objectives pursued when creating varieties are known (Auboiron *et al.* 1998), the lack of research on farmers' knowledge and their expertise of the existing varietal potential is deplorable (CRDI 2001). A study of these farmer's knowledge would be a useful contribution to the improvement of production systems by the introduction of new varieties. The present study is concerned with local knowledge of the different plantain varieties and the factors which determine the choice of varieties by the growers.

Materials and methods

In order to identify the varietal preferences of the growers and to clarify the dynamics involved in this choice, an inventory of local varieties was carried out in two departments of the central province: one in the area of Mbam and Kim (an area of intense migration and thus of much ethnic and cultural mixing) and the other in the area of Nyong and Mfoumou (where there is less migration). The aim was to take two different situations (from the social and cultural point of view) liable to affect varietal diversity. Three localities were chosen because of their high plantain production, identified from surveys in urban markets: Talba

and Téata in Mbam and Kim, and Ayos in Nyong and Mfoumou.

The climate in the three localities is tropical, Guinea-Sudanese, with four seasons, two wet and two dry. Fifteen small farmers were chosen at random at Talba, 15 at Téata and 20 at Ayos, making a total of 50 growers. They belong to the largest socio-cultural groups of the various localities: Eton, Manguissa, Yambassa and Sanaga at Talba and Téate; Yebekolo, Omvang and Makia at Ayos.

The collection of data by questionnaire was accompanied by visits to the farmers' holdings. The small sample means that little in the way of quantitative analysis is possible but it allows us to note the diversity of the existing situation, to explain the determinants of this diversity and to rank the preferences of the producers. For this purpose, farmers were asked to name the five main criteria used to determine their preference and to rank them from the most to the least important. Secondly, the number of occurrences of a given criterion was weighted according to the weight associated with the rank accorded by the farmers, to give a weighted preference index.

It often happened that a variety was mentioned several times under different names or that different varieties were thought to be the same by people from the same or different localities (Table 1). Clarifying these two points so as to check for synonyms involved a lot of verification work by returning frequently to the area after the initial survey. Finally, certain plantains could not be identified from the farmers' description. These have been partly classified from suggestions provided by certain authors (Tézenas du Montcel 1979, Rossel 1998).

Results and discussion

Investigation of the local varietal diversity

A wide varietal diversity was observed - altogether 37 varieties (Table 2). On average, a grower identified between 8 and 9 varieties. Although the number of varieties listed was much the same in the three localities (21 at Talba, 20 at Téate and 23 at Ayos), the number of the most grown varieties varied. Thus at Talba, the most grown varieties were five plantains ('Essong', 'Élat', 'Assugbegle', 'Alovina', 'Otug'); eight at Téate ('Essong', 'Élat', 'Assugbegle', 'Alovina', 'Otuga', 'Mo', 'Assang-da', 'Ossen'); and also eight at Ayos ('Essong', 'Élat', 'Assugbegle', 'Assang-da', 'Nya Vombo', 'Nyo', 'Ebang', 'Azem').

Talba and Téata are in the same area (*Mbam and Kim)*, but the number of the most grown varieties was slightly more at Téate, a village situated in a settlers' area where there is a lot of mixing of the populations coming from different parts of the country. These newcomers are going to first try out a fairly wide range of varieties which they find in their new home or which they have brought from their former home before deciding, after one or two seasons, to keep just those which they prefer. Talba, being a non settlers' village, has fewer varieties which are widely grown.

Classification of local plantains

The criteria for varietal description used by the farmers are the colour and dimension of the bunch (number of hands), the size, length and angle of the fingers, the presence or not of a bud, the colour of the pseudostem and the sap, and the taste and softness of the pulp of the plantain. Although they vary from one farmer to another, these criteria not only made it possible to match and/or distinguish the names of certain plantains in different dialects and/or originating from different localities, but also to group them into recognised plantain types.

Hence a classification was attempted, but unlike those of other authors (Tézenas du Montcel 1979, Rossel 1998), our surveys of the peasants' perceptions did not reveal a difference between the 'French horn' and 'False horn' types. We have therefore classified these varieties under the types French, False horn and True horn: French : 'Azem[1]', 'Essong', 'Mo', 'Nyo', 'Zok' (r)[2], 'Ngon moto', 'Anthia', 'Ngoué', 'Alomoro', 'Elat', 'Alovina', 'Obel' (t), 'Nkounda

[1] The names of plantains are given in Eton, which is the ethnic group most represented in our study.

[2] Names followed by (t) and/or (r) are those which the work of Tézenas du Montcel (t) or Rossel (r) was able to classify.

Table 1. Local names given to the same variety by different tribes.

Eton name	Synonyms used by other tribes				
	Sanaga	**Makia**	**Manguissa**	**Yebekolo/Omvang**	**Yambassa**
Essong (t,r)*	Endjo	Sag			Guimananyagna
Elat (t,r)	Irata	Duindje/Duind			
Assugbegle	Ambobenguéré		Avot begle(t)		Kanatchongno
Alovina (t)	Alahindi/ Mbinobinor	Abiyilé		Ekoan Otira/ ZipEkoan/Alouvinda	
Otouga (rouge)	Obutekondo	Nkoumo®			Ibulu
Obel (t)					
Assang da (t,r)		Akos-wouroung		Assang Assang	
Nyo			Bogloboglo		
Ossen (t,r)	Monda Monda				
Nya Vombo		Ekoan Ndengué/ Ngwak/Mbouroukou/ Ampouamb		Ekoan Mekia	
Ngoué		Nku Kuant			
Ebang (t,r)		Bang (t,r)			
Messong me Zé (t,r)			Djaé Zé		
Etutunu	Ambarangondé		Etunbekogo	Ekoan Awoura	

*Names also used by Tézenas du Montcel (t) and Rossel (r).

Table 2. Farmers' classification of local plantains.

Name of plantain	Meaning	Number of times cited			Elements of varietal description used by farmers	Type
		Talba	Téate	Ayos		
Essong (t, r)*		15	15	10	10-15 hands, big pseudostem, bud	French
Elat (t,r)	The union	15	15	19	8 hands, thin fingers, bud	French
Mo (t)		4	11	0	Medium-sized red fingers, bud	French
Assugbegle (t)	Hard to carry	15	15	19	1-5 hands, long, fat curved fingers, no bud	Horn
Alovina (t,r)	Night falling	15	15	6	8-10 hands, pale green, bud, reddish pulp	French
Otouga (r)		10	13	0	1-7 hands, red/normal pseudostem, shrivelled bud, fat fingers	False horn
Assang da (t,r)	One hand	6	11	10	1 hand, no bud, fingers fat and scattered	Horn
Ossen (t)	Squirrell	6	10	3	Leaves/fingers striped, bud, small bunch	French
Onundji	Gorilla's finger	0	2	1	3-4 hands, fingers short and fat, bud, resembles banana	
Nya vombo (t, r)		7	7	15	Shrivelled bud, 2-6 hands, fat fingers, long and yellowish	False horn
Ombanga		6	0	0	4 hands, bud, many fingers	
Nya ékoan	True plantain	2	0	0		
Nyo ékoan (r)	Snake plantain	7	5	16	Bud, 1-15 twisted hands	French
Obel ékoan (t)		5	1	5	6 hands, short bulging fingers, pseudostem/veins reddish	
Etoutounou	The dwarf	1	5	3	Resembles banana, 8 hands, short fat fingers, bud	
Ntubna		0	1	0	Small bunch, thin fingers	French
Obura		0	1	0	Short fat fingers	
Ebang (t, r)		0	1	16	1-6 hands, shrivelled bud, fat, twinned, dehiscent fingers	False horn
Messong me Zé (t,r)	Panther's teeth	3	2	5	1-3 hands, no bud, fat, long, straight, yellowish fingers	Horn
Mbom ékoan		1	0	0		
Mebémengon (t)	Girl's breasts	1	0	0		
Ngon moto	Man's daughter	0	1	0	Small bunch, thin fingers, bud	French
Alomoro	Human ear	0	1	0	Medium-sized bunch, short fingers, bud	French
Ekoan metcha		0	2	2	Small bunch, short and angular fingers, shiny green pseudostem, white pulp, bud	French
Nkunda bang (r)		2	0	0		
Ambarangondé		4	0	0	Resembles banana	French
Azem		0	0	12	More than 10 hands, bud, many thin fingers	French
Nyog ékoan (r)		0	0	1		Horn
Anthia (t,r)	The blood	0	0	2	Red sap	French
Mvodo ékoan		0	0	9	4-5 hands, fingers lined, shrivelled bud, leaves sometimes streaked	False horn
Zok ékon (t, r)	Elephant plantain	0	0	2		French
Ekoan awoura	Disgusting plantain	0	0	3	Big bunch, bud	
Allen ékoan (r)	Palm plantain	0	0	1	Small fingers, bunch points towards sky	
Mvep ékoan	Hedgehog plantain	0	0	4		
Ngoué ékoan	Pig plantain	0	0	4	8-10 hands, fat fingers, bud	French
Akesse		2	0	0		
Mbimbo		2	0	0		
Total		21	20	23		

*Plantains also listed by Tézenas du Montcel (t) and Gerda Rossel (r).

bang' (r), 'Onundji' (r), 'Ntubna', 'Ossen', 'Nya', 'Mboé', 'Mebémengon', 'Etutunu'. 'False horn' : 'Ebang', 'Otuga rouge', 'Otouga vert', 'Mvodo', 'Nya Vombo', Ombanga. 'True horn' : 'Assugbegle', 'Assang-da', 'Messong me' 'Zé' (t,r), 'Nyog' (r).

There remain varieties which have not yet been definitely identified. The work of botanical identification is still in progress. These are 'Obura', 'Allen', 'Mvep', 'Akesse' and Mbimbo'.

Varietal particularities

- 'Nyo' : This is a French giant which is found in two forms: one has numerous spiral hands while the other has only one which winds round the bunch. The snake-like appearance has earned two of the forms the name 'Nyo ékoan' which means 'snake plantain'.
- 'Otouga' : two forms of this False horn are also found, the difference being the red-violet colour of the pseudostem of one of them.
- 'Allen ékoan' : This is a variety whose bunch points straight towards the sky like that of a palm tree. Hence the name 'Allen ékoan' which means 'palm plantain'.
- 'Anthia' : A plantain with reddish sap. 'Anthia' means "blood".
- 'Ossen ékoan' : A variety with streaks on the fingers and leaves. 'Ossen' means "squirrel".

• According to the farmers, depending on the situation, the variety 'Assang-da' (one hand) can be prone to "sterility" and is called 'Nnom ékoan' (male plantain). Its inflorescence is erect, without hands or fingers like the 'nothing but green' or 'nothing but red'.

Agronomic parameters

Although all plantains are vulnerable to the toppling and breakage of the pseudostem, especially from the second ratoon crop onwards, 'Essong' is, according to the growers in Talba and Téte, less affected by this problem than other varieties. The fact that this has not been validated under experimental conditions raises the question of the influence of the environment (such as soil, weather, cultural practices) on the relative hardiness of varieties.

Every plantain whose inflorescence emerges within 12 months of planting is considered as early by the growers, or late if it takes longer. 'Elat', 'Assugbegle', and 'Ebang' (about 8% of the varieties) are early. The varieties regarded as late are 'Essong', 'Nyo', 'Alovina', 'Mvodo', 'Azem', 'Obel', 'Mo', 'Mbimbo', 'Otuga' and 'Nya ékon' (27% of the varieties). The growers indicate, however, that this earliness can vary according to the pest pressure, given that pesticides are not used.

Depending on the number of suckers produced by the mother plant, the growers classify plantains as follows:

• Varieties which sucker abundantly: number of suckers > 10: 'Essong', 'Elat', 'Mo', 'Assugbegle', 'Ombanga'.
• Varieties with average suckering: number of suckers 5-10: 'Obel', 'Otuga', 'Alovina'.
• Varieties with poor suckering: number of suckers < 5: 'Nya Vombo', 'Nyo'.

Kwa (1998) attributed to 'French sombre' and 'Mbouroukou No. 1' ('Alovina' and 'Nya Vombo') maximum cumulative values of 12 and 8 suckers/plant at 16 and 14 months into the cycle respectively. The relatively poor suckering of 'Alovina' (5-10) and of 'Nya Vombo' (<5) noted by the growers is explained, under extensive production conditions, by drought and the disappearance of suckers at the surface (Kwa 1998).

During storage or transport of the bunches to market, plantains suffer shocks and loss of fingers which affect the market quality of the product. Certain varieties are more sensitive to these shocks. 'Elat' (according to 56% of the farmers), 'Assugbegle' (32%) and 'Essong' (30%) are regarded as the most resistant to these problems.

The basis of farmers' varietal choices

In the selected areas, the plantain has become a source of revenue; more than 50% of the production is sold by 60% of the growers. The range of varieties sold is larger at Ayos ('Essong', 'Elat', 'Assugbegle', 'Nyo', 'Ebang', 'Azem') than at Téate ('Essong' and 'Assugbegle'). In all areas the research objectives for market plantains are the same and are concerned with the bunch - plenty of hands and long, fat fingers.

For their personal consumption, the growers prefer 'Elat' and 'Alovina' at Talba and Téata, and 'Elat', 'Ebang' and 'Nya Vombo' at Ayos. The features particularly favoured are a fairly sweet taste of the plantain, even when green, this flavour usually being more marked than at the yellow stage of the bunch. Also, softness of the pulp even when chilled is desirable, although plantains normally only possess this characteristic when warm. Firmness of the pulp, another required quality, means in the case of the plantain that it should not taste as if it had soaked up water.

The variety 'Nya Vombo' is particularly liked in Ayos as it is used for making a special dish called "Ndengué", typical of the Ayos region of eastern Cameroon.

It appears from the calculation of a weighted preference index that the growers give first priority to the size of the bunch, then to taste and texture, and lastly to agronomic characteristics (Table 3).

Selection and management of varietal diversity

More than 87% of the growers said they were short of planting material. The practice of taking suckers from old plantations is the cause of diseased planting material.

To correct this, more than 52% of respondents practice deliberate storage of suckers before planting, from a few days to

Table 3. Selection criteria classified according to the preferences expressed by farmers.

Criterion	Importance of criterion to grower					WPI[b]
	1st place (5[a])	2nd place (4)	3rd place (3)	4th place (2)	5th place (1)	
Large bunches	35[c]	9	3	0	1	221
Length/weight of fingers	6	23	6	3	0	146
Taste/softness of pulp	4	7	15	5	1	104
Earliness	4	1	6	8	5	63
Hardiness	0	3	0	1	5	19
Resistance to toppling	0	0	3	1	0	11
Suckering	0	1	4	6	11	39
Lifespan of the corm	0	1	0	1	4	10

[a] Weighting index
[b] Weighted preference index
[c] Number of respondents who expressed this preference

as much as two months. At the end of this storage, during which the suckers are kept dry in heaps, either in the field or at the farmer's home, the good suckers are those which have put out a shoot; the others are considered diseased and are left to rot.

These practices considerably reduce the availability of plant material. Because of this, the growers plant all the available material, stored or otherwise, and find it difficult to practice any real varietal selection. Most of them realize therefore that the varieties they plant are not necessarily the ones they prefer from the point of view of sale or home consumption. Moreover, suckers bought at the market are not differentiated as to their variety. The grower discovers after planting what variety he has planted, which is an important limiting factor in evaluating the adaptation of varieties to the environment and consequently in adapting his cultural practices. Changes in multiplication techniques and the introduction of integrated pest management would greatly improve plantain growers' capacity for selection.

Conclusion

This work details the requirements of growers' and the factors which might cause these to change. It shows that selection by growers is hampered by the methods currently used for producing suckers. Knowledge of farmers' practices is currently used to validate agronomic innovations introduced in areas under consideration and the setting up a network of "collections" managed by farmers. This work needs to be backed up by a systematic collection and a botanical description of the surveyed plantains to check whether the unidentified varieties are already present in the collection. This study has been carried out in only two of the ten departments of the central province. Other centres of plantain production, which will undoubtedly have peculiarities of their own, remain to be discovered.

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C. Mengue Efanden, *and* ***L. Temple*** *work at the* Centre africain de recherches sur les bananiers et plantains *(CARBAP), BP 2572, Yaoundé, Cameroun, e-mails: mecy@hotmail.com and temple@iccnet.cm (principal correspondant), and* ***K. Tomekpe*** *works at CARBAP, BP 832, Douala, Cameroun, e-mail: tomekpe@camnet.cm*

Socioeconomic data on the plantain commodity chain in West and Central Africa

R. Nkendah and E. Akyeampong

In West and Central Africa, bananas and plantains make an important contribution to food security, employment, diversification of income sources in rural and urban areas, the gross national product (GNP) and, by doing so, to the fight against poverty (Temple *et al.* 1997, Temple *et al.* 2000, Nkendah 2001). Despite their importance to development, decision-makers do not have sufficient information at their disposal to develop and implement specific policies. The creation of a freely accessible and relevant database might help ensure that bananas and plantains are given better consideration when farming policies are formulated, and thus increase their impact. This article presents the results of a collection of baseline data on bananas and plantains in West and Central Africa with the aim of making recommendations to improve the existing data and to identify the needs for additional data which would justify future surveys. The data sources used are mainly made up of national reports which were summarised by the INIBAP West and Central African regional office (Nkendhah 2002). Because of the shortage of statistical data in certain countries, this article